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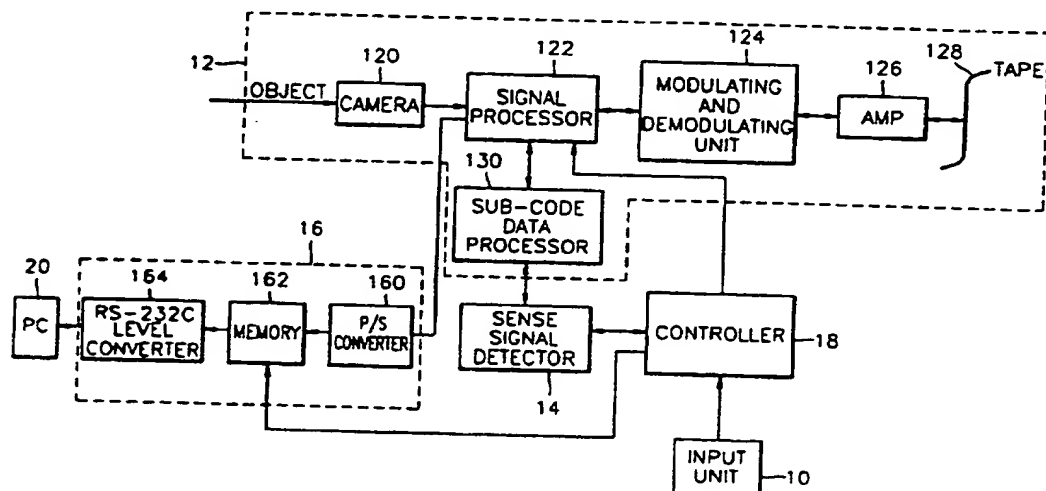
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(54) Abstract Title

Digital video camera with still image search function

(57) A digital video camera in which snapshot photographed data can be automatically searched and transferred by recording image data photographed (120) in a snapshot mode and a snapshot photographing sense signal for sensing the image data photographed in the snapshot mode so as to respectively correspond to a video area and a sub-code area of a recording medium (128). In a search mode, a snapshot photographing sense signal detector (14) is used to detect the snapshot photographing sense signal stored in the sub-code area of the recording medium (128), and the corresponding image data is transferred for example, to a PC (20). Accordingly, a high speed search and a continuous transfer can be performed since the search and transfer are performed using the snapshot photographing sense signal recorded on the sub-code area when each snapshot photograph is taken.

FIG. 1



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FIG. 2

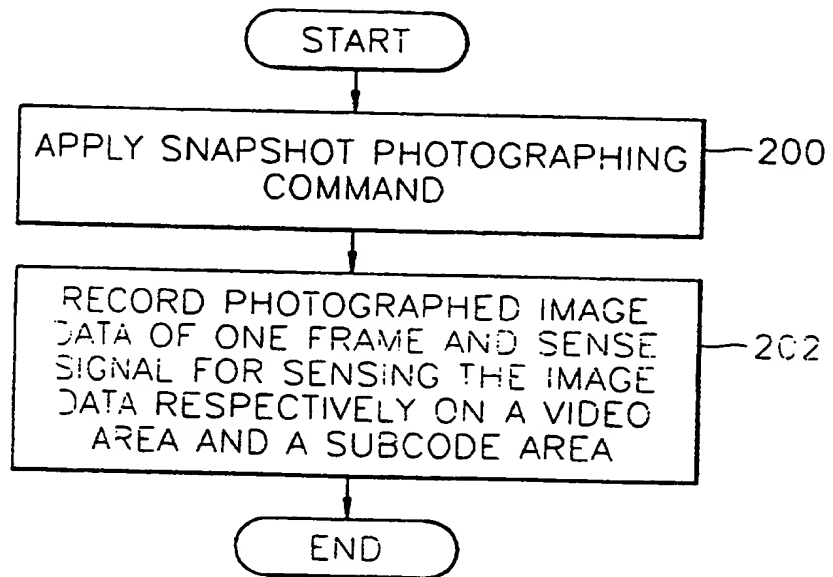
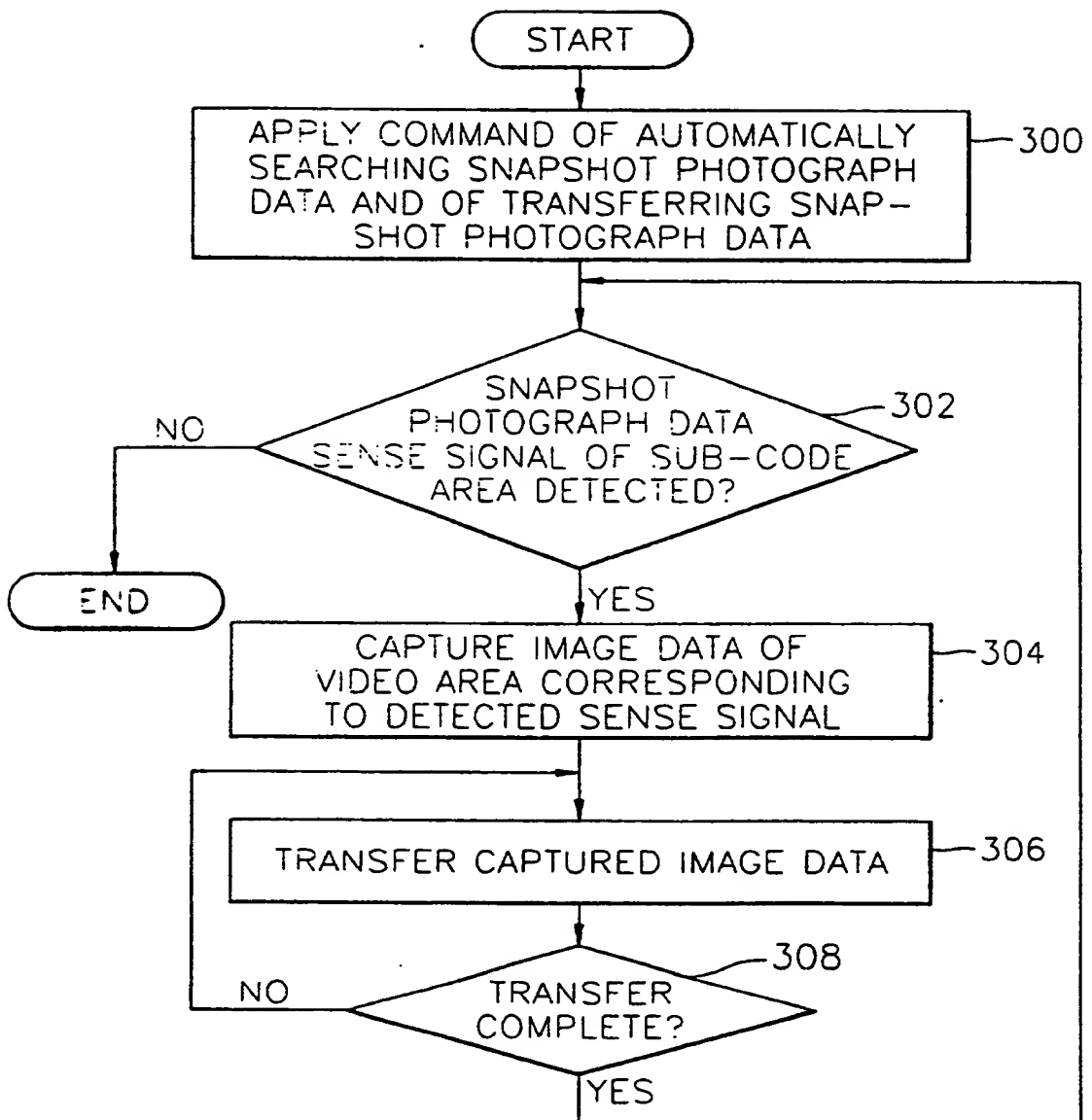


FIG. 3



DIGITAL VIDEO CAMERA FOR AUTOMATICALLY SEARCHING AND
CONTINUOUSLY TRANSFERRING SNAPSHOT PHOTOGRAPHED IMAGE DATA

The present invention relates to a digital video
5 camera (DVC), and more particularly, to a digital video
camera in which snapshot photographed image data can be
automatically searched and continuously transferred, a
method for recording snapshot photographed image data, and
a searching and transferring method for automatically
10 searching the recorded image data and transferring the
searched data.

In a conventional digital video camera, using a
linearly accessible recording medium such as a video tape,
15 in order to search snapshot photographed image data and
transfer the searched image data, a series of operations
of individually searching the section of the snapshot
photographed image data and capturing the searched image
data as a still picture and transferring the still picture
20 to a personal computer (PC) are manually processed.

Therefore, in order to transfer various snapshot
photographed image data to the PC, a user must perform
repeated operations until the image data of one frame unit
25 is captured as a still picture and the captured still
picture is transferred to the PC.

It is an aim of the present invention to provide a
digital video camera for automatically recording snapshot
30 photographed image data on a recording medium, and
preferably for automatically searching and retrieving the
snapshot photographed image data, and further preferably
for transferring the searched image signal to a personal
computer (PC).

It is another object of the present invention to provide a method for recording the snapshot photographed image data.

5 It is still another object of the present invention to provide a method for automatically searching the recorded image data and transferring the searched image data to the PC.

10 According to a first aspect of the present invention there is provided a digital video camera, comprising: a recording/reproducing unit for recording image data photographed in a snapshot mode in a video area of a recording medium, and a snapshot photograph sense signal
15 in a sub-code area of said recording medium.

 Preferably, in a search mode said recording/reproducing unit searches the recording medium for said image data recorded in a video area of the
20 recording medium by searching the sub-code area of the recording medium for a corresponding snapshot photograph sense signal recorded therein.

 Preferably, said recording/reproducing unit
25 repeatedly scans said recording medium to thereby retrieve a plurality of recorded image data according to corresponding snapshot photograph sense signals recorded in a sub-code area.

30 According to a second aspect of the present invention there is provided a digital video camera, comprising an input unit for applying commands of snapshot photographing and automatically searching and transferring the snapshot photographed image data, a
35 recording/reproducing unit for recording image data

photographed in a snapshot mode and a snapshot photographing sense signal for sensing the image data photographed in the snapshot mode so as to respectively correspond to a video area and a sub-code area of a recording medium in a recording mode, and for searching the recorded image data by the sense signal and capturing the image data in a search mode, a snapshot photographing sense signal detector for detecting the snapshot photographing sense signal stored in the sub-code area of the recording medium, a transferring unit for transferring the image data captured in the recording/reproducing unit according to a predetermined control signal, and a controller for receiving a predetermined command from the input unit, controlling the snapshot photographing sense signal detector to operate, inputting the snapshot photographing sense signal received from the snapshot photographing sense signal detector, controlling the recording/reproducing unit to capture the image data corresponding thereto, and controlling the transferring unit to transfer the captured image data.

Further, according to a third aspect of the present invention is provided a method for recording snapshot photographed data, comprising the steps of applying a snapshot photographing command and recording photographed image data of one frame and a sense signal for sensing the photographed image data of one frame respectively on a video area and a sub-code area of a recording medium.

Further still, according to a fourth aspect of the present invention there is provided a method for searching/transferring snapshot photographed image data, comprising the steps of (a) applying a command of automatically searching and transferring snapshot photographed image data, (b) detecting a snapshot

photographing sense signal of a sub-code area, (c) capturing the image data of a video area corresponding to the detected sense signal, and (d) transferring the captured image data, wherein, when the transfer of one
5 frame of the image data is complete, the steps (b) and (d) are repeated so as to detect and transfer image data of the next frame.

For a better understanding of the invention, and to
10 show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings, in which:

Figure 1 is a block diagram showing the structure of
15 a digital video camera according to the present invention;

Figure 2 is a flowchart showing a method for recording data photographed in a snapshot photographing mode according to the present invention; and
20

Figure 3 is a flowchart showing a method for searching image data photographed in a snapshot mode and recorded on a recording medium at a high speed and transferring the same according to the present invention.
25

The apparatus shown in Figure 1 includes an input unit 10 for applying a predetermined command, a recording/reproducing unit 12, a sense signal detector 14 for sensing image data photographed in a snapshot mode, a
30 transferring unit 16 for transferring the captured image data to a personal computer (PC) 20, and a controller 18.

The input unit 10 applies a command of photographing in a snapshot mode and of automatically searching and
35 transferring the snapshot photographed image data.

The recording/reproducing unit 12 includes a camera 120, a signal processor 122, a modulating and demodulating unit 124, an amplifier 126, a recording medium 128 such as magnetic tape, and a sub-code data processor 130. In a recording mode, the recording/reproducing unit 12 records the image data photographed in the snapshot mode and the sense signal for sensing the snapshot photographed image data so as to respectively correspond to a video area and a sub-code area of the recording medium. In a search mode, the recording/reproducing unit 12 searches the recorded image data by the sense signal and captures the searched data.

The sense signal detector 14 detects the snapshot photographing sense signal stored in the sub-code area of the recording medium 128.

The transferring unit 16 includes a parallel to serial data converter 160, a memory 162, and a level converter 164. The transferring unit 16 stores the image data captured in the recording/reproducing unit 12 and transfers the image data in units of one frame according to a predetermined control signal.

The controller 18 receives a predetermined command from the input unit 10, controls the sense signal detector 14 to operate, receives the snapshot photographing sense signal from the sense signal detector 14, controls the recording/reproducing unit 12 so as to capture the image data corresponding to the received sense signal, and controls the transferring unit 16 to transfer the captured image data to the PC 20.

The apparatus shown in Figure 1 operates as follows.

First, when a snapshot photographing command is applied through the input unit 10, the controller 18 controls the signal processor 122 so that the photographed image data from the camera 120 and the sense signal corresponding to the image data are respectively recorded on the video area and the sub-code area of the recording medium 128. On the other hand, the sub-code data processor 130 encodes the data of the sub-code area processed in the signal processor 122, namely, the sense signal.

When a command of searching the snapshot photographed image data from the recording medium 128 on which the snapshot photographed data are recorded and of transferring the searched image data is applied through the input unit 10, the controller 18 controls the sense signal detector 14 to resume an operation, receives the sense signal from the sense signal detector 14, controls the signal processor 122 to capture the image data corresponding to the sense signal, and controls the transferring unit 16 to transfer the image data captured in the signal processor 122.

The transferring unit 16 converts parallel data output from the signal processor 122 to serial data, stores the converted data in units of one frame, converts the serial data level to a level corresponding to an RS-232C protocol, and transfers the converted data to the PC.

In the present invention, a series of operations of searching a plurality of snapshot photographed image data stored in the recording medium according to the sensing signal and transferring the searched image data to PC are continuously and automatically performed.

Figure 2 is a flowchart showing a method for recording the data photographed in a snapshot photographing mode according to the present invention.

5 In step 200, a snapshot photographing command is applied.

10 In step 202, the image data photographed one frame and the sense signal for sensing the image data are respectively recorded on the video area and the sub-code area of the recording medium.

15 Figure 3 is a flowchart showing a method for searching the image data photographed in the snapshot mode and recorded on the recording medium at a high speed and for transferring the searched image data.

20 In step 300, the command of automatically searching snapshot photographed image data and transferring the same is applied.

25 In step 302, it is determined whether the sense signal of the snapshot photographed image data of the sub-code area is detected.

 In step 304, when the sense signal is detected, the image data of the video area corresponding to the detected sense signal is captured.

30 In step 306, the captured image data is transferred. Here, the image data of one frame unit is transferred. Next, when it is determined the transfer of the image data of one frame unit is completed (step 308) and the transfer of the image data of one frame is completed, the steps 302

through 306 are repeated so as to detect and transfer the image data of the next frame.

5 As described above, a high speed searching and a continuous transfer can be performed by recording the snapshot photographing sense signal corresponding to the photographing mode of the snapshot image data on the sub-code area and by using the same during reproduction thereof.

10

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this
15 specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and
20 drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

25 Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated
30 otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any
35 novel one, or any novel combination, of the features

- 9 -

disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1. A digital video camera, comprising:

5 a recording/reproducing unit for recording image data photographed in a snapshot mode in a video area of a recording medium, and a snapshot photograph sense signal in a sub-code area of said recording medium.

10 2. A digital video camera as claimed in claim 1, wherein in a search mode said recording/reproducing unit searches the recording medium for said image data recorded in a video area of the recording medium by searching the sub-code area of the recording medium for a corresponding
15 snapshot photograph sense signal recorded therein.

3. A digital video camera as claimed in claim 2, wherein said recording/reproducing unit repeatedly searches said recording medium to thereby retrieve a plurality of
20 recorded image data according to corresponding snapshot photograph sense signals recorded in a sub-code area.

4. A digital video camera, comprising:

25 an input unit for applying commands of snapshot photographing and automatically searching and transferring the snapshot photographed image data;

30 a recording/reproducing unit for recording image data photographed in a snapshot mode and a snapshot photographing sense signal for sensing the image data photographed in the snapshot mode so as to respectively correspond to a video area and a sub-code area of a recording medium in a recording mode, and for searching

the recorded image data by the sense signal and capturing the image data in a search mode;

5 a snapshot photographing sense signal detector for detecting the snapshot photographing sense signal stored in the sub-code area of the recording medium;

10 a transferring unit for transferring the image data captured in the recording/reproducing unit according to a predetermined control signal; and

15 a controller for receiving a predetermined command from the input unit, controlling the snapshot photographing sense signal detector to operate, inputting the snapshot photographing sense signal received from the snapshot photographing sense signal detector, controlling the recording/reproducing unit to capture the image data corresponding thereto, and controlling the transferring unit to transfer the captured image data.

20

5. A method for recording snapshot photographed data, comprising the steps of:

25 applying a snapshot photographing command; and

25

recording photographed image data of one frame and a sense signal for sensing the photographed image data of one frame respectively on a video area and a sub-code area of a recording medium.

30

6. A method for searching/transferring snapshot photographed image data, comprising the steps of:

35 (a) applying a command of automatically searching and transferring snapshot photographed image data;

(b) detecting a snapshot photographing sense signal of a sub-code area;

(c) capturing the image data of a video area
5 corresponding to the detected sense signal; and

(d) transferring the captured image data, wherein
when the transfer of one frame of the image data is
complete, the steps (b) and (d) are repeated so as to
10 detect and transfer image data of the next frame.

7. A digital video camera substantially as hereinbefore
described with reference to Figure 1 of the accompanying
drawings.

15

8. A method for recording snapshot photographed data,
substantially as hereinbefore described with reference to
Figure 2 of the accompanying drawings.

20 9. A method for searching/transferring snapshot
photographed image data, substantially as hereinbefore as
described with reference to Figure 3 of the accompanying
drawings.



Application No: GB 9814128.6
Claims searched: 1 to 9

Examiner: Donal Grace
Date of search: 17 November 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): G5R (RHD, RHE) H4F (FKC)

Int Cl (Ed.6): G11B 27/30, 27/32, 31/00 H04N 1/21, 5/77

Other: Online: WPI

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|---|--------------------|
| X | EP 0659017 A2 (EASTMAN KODAK) | 1 to 6 |
| X | EP 0639927 A2 (SONY) | 1 to 6 |
| X | EP 0105213 A2 (HITACHI) | 1 to 6 |
| X | US 5635983 (OHMORI) | 1 to 6 |
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